The eDL mobile app

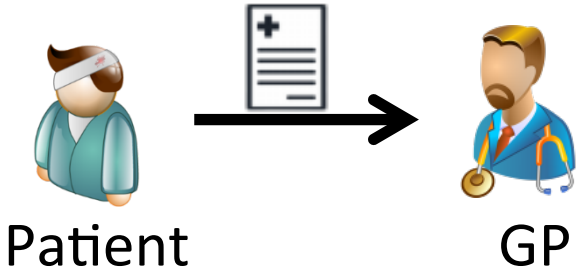
Improving communication between hospitals, patients and community physicians

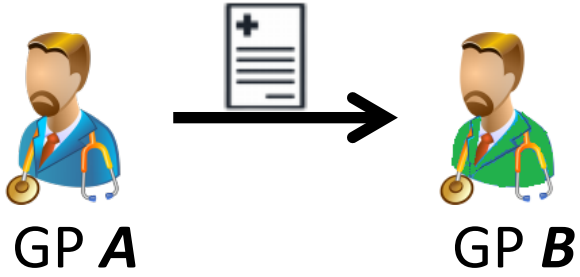
Heerlen, October 25th, 2012

Dr. Leonardo Lezcano
Dr. Stefaan Ternier
Dr. Hendrik Drachsler
Dr. Marco Kalz
Dr. Marcus Specht
CELSTEC, OUNL

Education and Culture
Lifelong learning Programme

Discharge Letter exchange scenarios





Communication between hospitals and local medical officers and GPs.

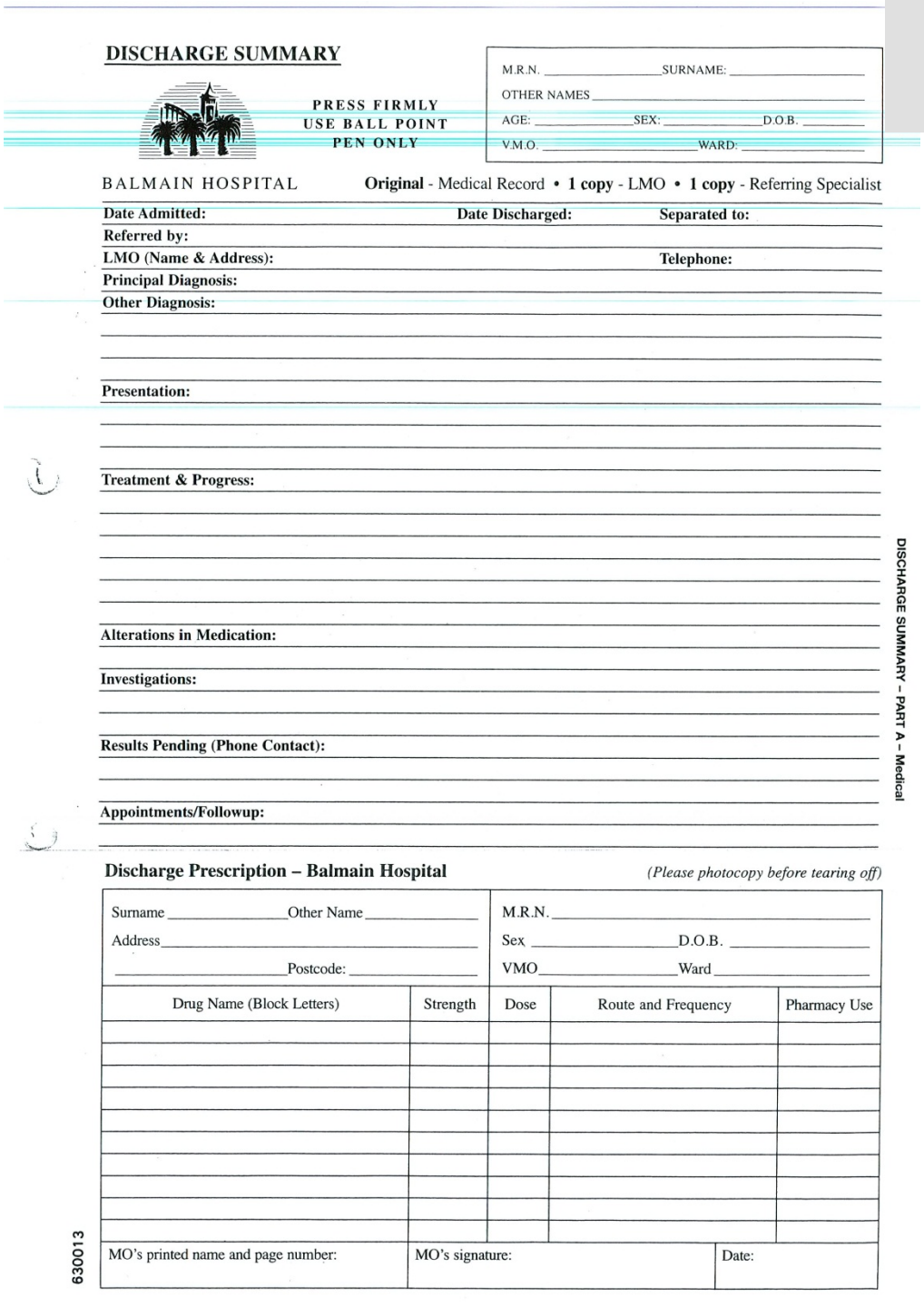
Summary data which clinical coders rely upon for clinical classification.

Medico-legal purposes, financial and administrative functions.

They contain: administrative info, follow-up appointments, clinical info, problems on admission, diagnosis, procedures performed, medications on discharge…

Support continuity of care.

Discharge Letter



DISCHARGE SUMMARY

PRESS FIRMLY
USE BALL POINT
PEN ONLY

M.R.N. _____ SURNAME: _____
OTHER NAMES _____
AGE: _____ SEX: _____ D.O.B. _____
V.M.O. _____ WARD: _____

BALMAIN HOSPITAL **Original** - Medical Record • **1 copy** - LMO • **1 copy** - Referring Specialist

Date Admitted: **Date Discharged:** **Separated to:**
Referred by:
LMO (Name & Address): **Telephone:**
Principal Diagnosis:
Other Diagnosis:

Presentation:

Treatment & Progress:

Alterations in Medication:

Investigations:

Results Pending (Phone Contact):

Appointments/Followup:

DISCHARGE SUMMARY – PART A – Medical

Discharge Prescription – Balmain Hospital *(Please photocopy before tearing off)*

Surname _____ Other Name _____
Address _____
_____ Postcode: _____

M.R.N. _____
Sex _____ D.O.B. _____
VMO _____ Ward _____

Drug Name (Block Letters)	Strength	Dose	Route and Frequency	Pharmacy Use

MO's printed name and page number: | MO's signature: | Date:

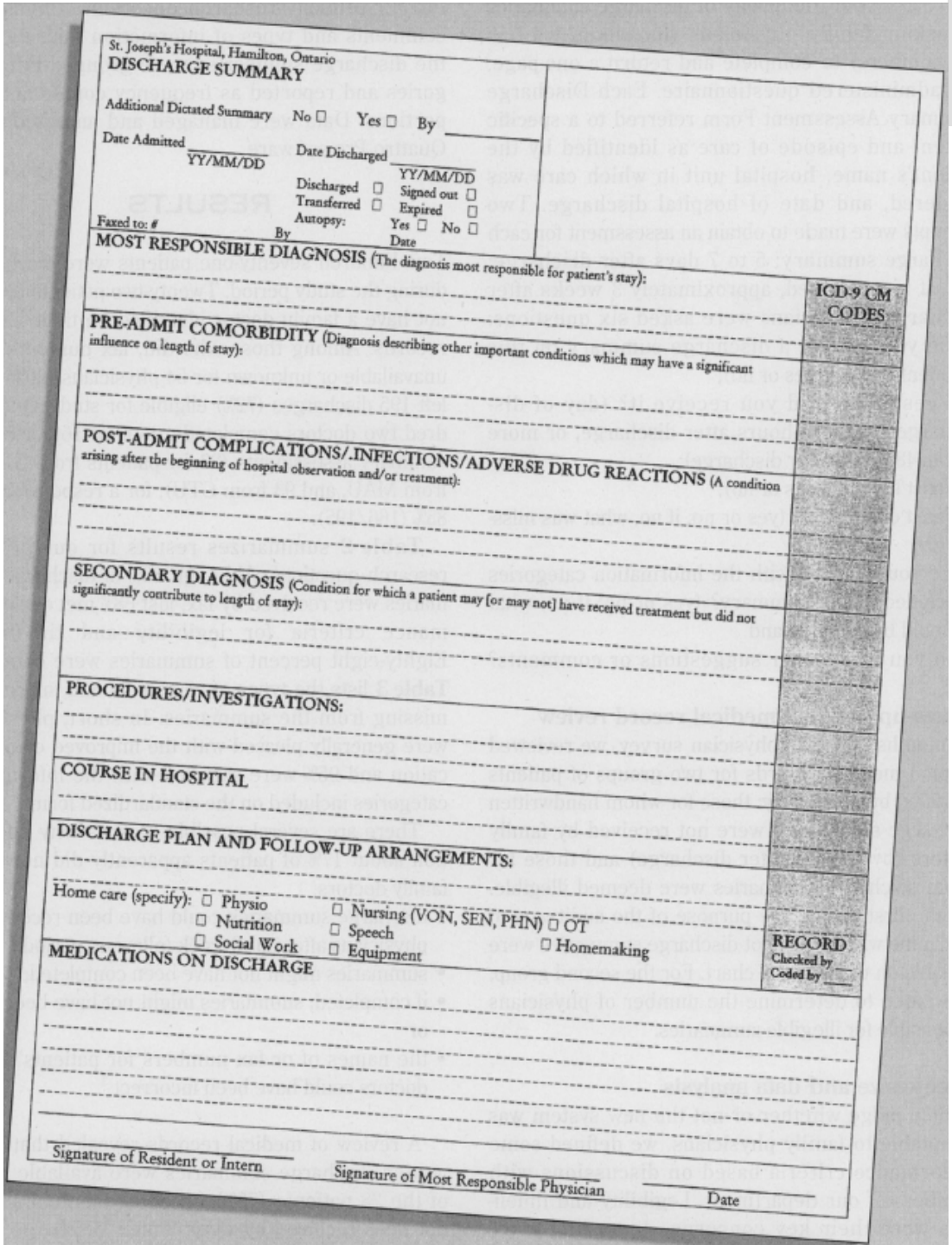
630013

Sample 1

Balmain Hospital, Sidney, Australia (2005)

- ✘ Handwritten (legibility)
- ✘ Free text, narrative (accuracy)
- ✘ Unstandardized
- ✘ Errors, omissions
- ✘ Slow prep. (bottleneck)
- ✘ Terminology bindings
- ✘ Difficult integration in EHR systems

Discharge Letter



St. Joseph's Hospital, Hamilton, Ontario
DISCHARGE SUMMARY

Additional Dictated Summary No ☐ Yes ☐ By _____

Date Admitted _____ YY/MM/DD

Date Discharged _____ YY/MM/DD

Discharged ☐ Signed out ☐
Transferred ☐ Expired ☐
Autopsy: Yes ☐ No ☐

Faxed to: # By Date

MOST RESPONSIBLE DIAGNOSIS (The diagnosis most responsible for patient's stay):

ICD-9 CM CODES

PRE-ADMIT COMORBIDITY (Diagnosis describing other important conditions which may have a significant influence on length of stay):

POST-ADMIT COMPLICATIONS/.INFECTIONS/ADVERSE DRUG REACTIONS (A condition arising after the beginning of hospital observation and/or treatment):

SECONDARY DIAGNOSIS (Condition for which a patient may [or may not] have received treatment but did not significantly contribute to length of stay):

PROCEDURES/INVESTIGATIONS:

COURSE IN HOSPITAL

DISCHARGE PLAN AND FOLLOW-UP ARRANGEMENTS:

Home care (specify): ☐ Physio ☐ Nursing (VON, SEN, PHN) ☐ OT
☐ Nutrition ☐ Speech ☐ Homemaking
☐ Social Work ☐ Equipment

RECORD
Checked by ___
Coded by ___

MEDICATIONS ON DISCHARGE

Signature of Resident or Intern

Signature of Most Responsible Physician

Date

Sample 2

Paterson et al. (1999), Discharge Summary Study Group, Canada

- ✓ Terminology bindings
- ✘ Handwritten (legibility)
- ✘ Free text, narrative (accuracy)
- ✘ Unstandardized
- ✘ Errors, omissions
- ✘ Slow prep. (bottleneck)
- ✘ Difficult integration in EHR systems

eDischarge Letter

Paterson et al., *Dalhousie University Canada (2002)*

Sample 3

Patient Information:

Chart Number: 0000000013 **Date of Birth (YYYY/MM/DD):** 1962/Nov/15 **Sex:**

First Name: Mr. **Surname:** O

Copies to: Dr. T Dr. W

Admission Date (YYYY/MM/DD) : 2000/Jul/10
Discharge Date (YYYY/MM/DD) : 2000/Jul/11
Discharge/Transfer to : home
Alternate Level of Care (YYYY/MM/DD):

Most Responsible Diagnosis:

☐ Unstable Angina ☐ Arrhythmia ☐ Non Cardiac Chest Pain ☐ Heart Failure ☐ Acute Myocardial Infarction
☐ Pneumonia ☐ CHF ☐ Asthma ☐ Malignancy ☐ COPD
☐ Other (specify):

Comorbidities/Cardiac Risk Factors:

☐ Hypertension ☐ Diabetes ☐ Family History of IHD ☐ Smoking ☐ Dyslipidemia ☐ Obesity
☐ Other (specify):

Allergies: (specify)

Course in Hospital: (include stress test, cardiac cath & procedure results)
direct stent on right coronary from 98% to 0% residual stenosis. Intravascular Pre and Post per CART-1 confirmed excellent results of stent. ReoPro to decrease complication rate.

Pertinent Investigations / Lab Results:

Peak CK (U/L) Total cholesterol (MMOL/L) LDL cholesterol (MMOL/L)
EF % HDL cholesterol (MMOL/L) Triglycerides (MMOL/L)
Other significant results:

Follow Up:

☐ Family Doctor ☐ Specialist
☐ Home Support
☐ Heart Health Clinic ☐ Diabetes Management Centre ☐ Hypertension Clinic ☐ Heart to Heart Program

- ✓ Terminology bindings
- ✓ Semi-Structured
- ✓ Controlled Vocabularies
- ✓ Faster prep.
- ✗ Unstandardized
- ✗ Errors
- ✗ Difficult integration in EHR systems

eDischarge Letter

CDA Header
(document-information, patient oriented identification, treatment data, therapists and recipients of a treatment, addressee)

- **Provider**
  - hospital
  - department
  - consultant
- **Address**
  - main address
  - further recipients
- **Main patient data**
  - identification data (identification number, last name, first name, sex, date of birth, address)
  - data concerning the period of stay (stationary/ambulatory, date of admission and discharge)

CDA Body

- **Diagnoses**
  - main diagnoses (name of diagnoses, date of first diagnosis, ICD10-Code)
  - further diagnoses (name of diagnoses, date of first diagnosis, ICD10-Code)
- **History**
  - HPC (history of present complains, risk factors, medications etc.)
  - PMH (past medical history)
  - FH (family history),
  - Psycho-Social (occupation, home situation)
  - current problems (disclaim, risk factors, present medication etc.)
  - Other history
- **O/E (on physical examination)**
  - CVS (cardiovascular system)
  - CHEST
  - ABDO (abdominal)
  - CNS (central nervous system)
  - psychiatric evaluation
- **Technical examinations**
  - technical examinations, laboratory findings and functional examinations (ECG, X-ray, Ultrasound, lung function etc.)
  - **consultation examinations**
  - consultation examination (in house) e.g. ENT, dermatological review etc.
- **out patient examination (out house)**
  - (examination data brought by the patient e.g., ultrasound results)
- **Summary**
  - summary of hospital events
  - assessment
  - recommendation (following examinations, dates of next examinations /presentation)
- **Therapy-recommendation**
  - therapy (drug, generic name, application rate (od; twice daily), method of administration (p.o., i.v.), duration of medication)
  - Additional remarks (Endocardial-prophylaxes, alternative drug)
- **Signature**
  - Consultant, resident, fellow physician

Sample 4

Bludau et al.
Department of Internal Medicine, University of Heidelberg, Germany (2003)

- ✓ Terminology bindings
- ✓ Structured
- ✓ Controlled Vocabularies
- ✓ Faster prep.
- ✓ EHR standards
- ✓ Seamless integration in EHR systems
- ✘ Limited to the boundaries of healthcare systems

Remaining problems of eDL

"It is not necessarily the case that electronic summaries are of higher quality than handwritten ones […] electronic summaries may contain more deficiencies than handwritten summaries" (Callen et al., 2007)

We need a widely adopted standard for DLs:

- Candidate terminologies: **ICD, SNOMED, MeSH, UMLS, MEDCIN)**
- EHR standards: **HL7-CDA, openEHR, EN13606**
- In spite of being very similar, there are syntactical, structural and semantic differences that must be solved.
- National e-Health Transition Authority (Australia) & CLAS

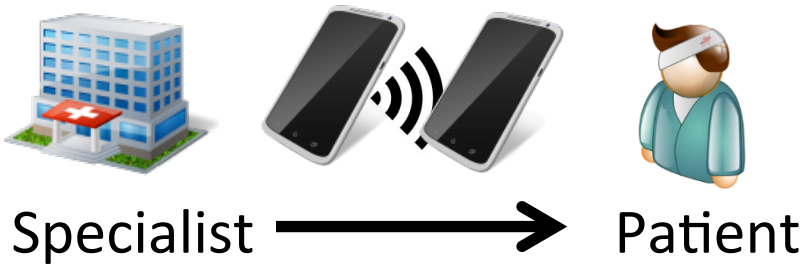
Privacy and Security Issues (II)

"…some health care providers were apprehensive about the electronic transfer of documents, and four GPs refused to receive electronic documents at all…" "one hospital's psychiatric ward declined electronic transmission of their discharge summaries because of the highly sensitive nature of the data contained therein" (Schabetsberger et al. (2006)

"signature functionality must be integrated into the workflow surrounding document creation, ideally by using Public Key Infrastructure (PKI)." (Brandner et al. (2002)

"…some countries have privacy legislation that prohibits the electronic transfer of discharge summaries…". (National E-Health Transition Authority, 2006)

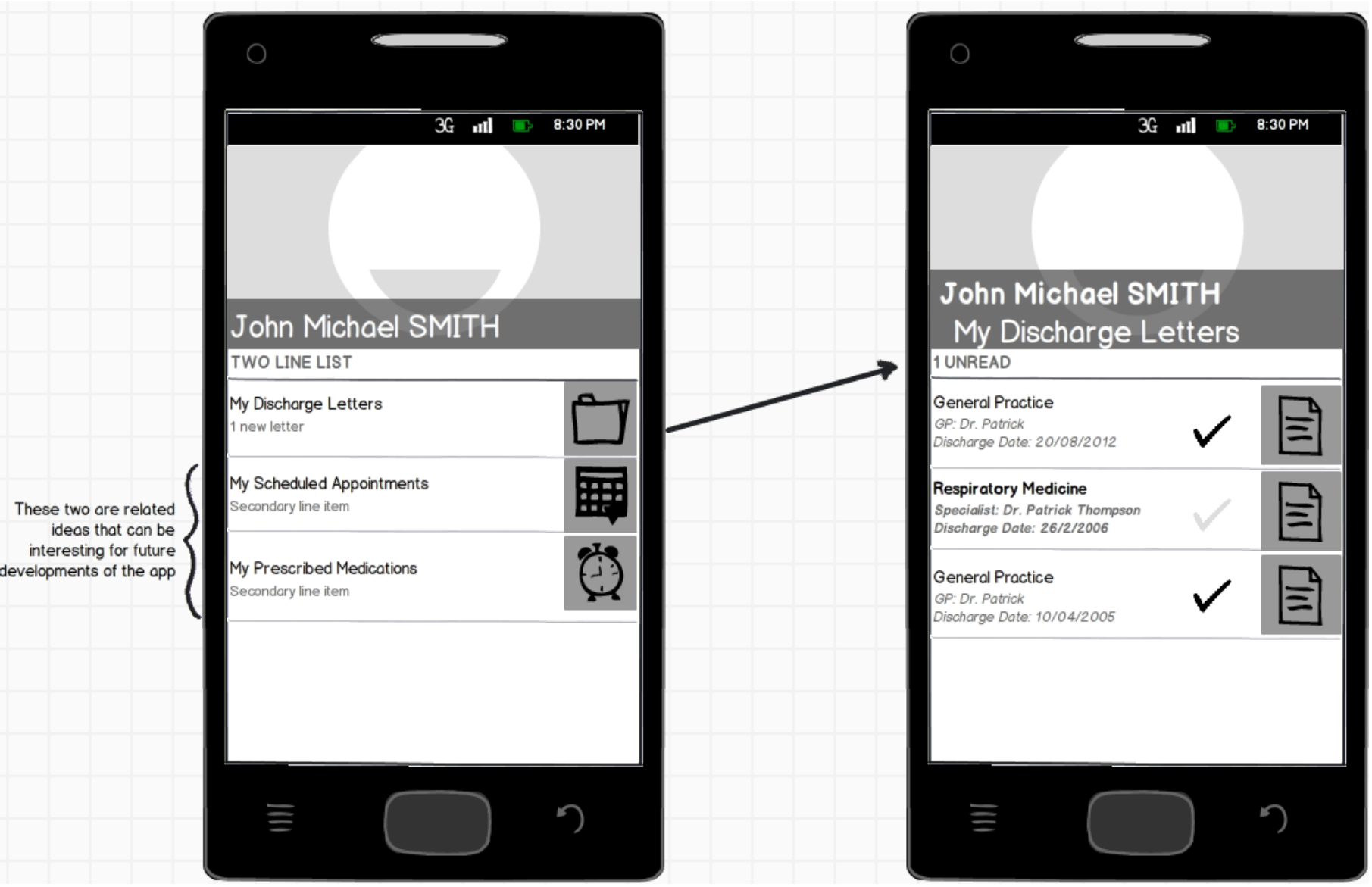
The eDL mobile app (I)



Technical Benefits

- No internet connection required
- No setting up required for the transfer.
- No pairing required.
- Maximum distance 4 cm (security and privacy).
- Mobile devices supporting NFC technology are growing in popularity
- E.g. Google Wallet is based on NFC.

The eDL mobile app (II)



The eDL mobile app (III)

Benefits for both the healthcare provider and the patient

- Bridging the gap between primary and secondary care.
- Fully structuring and semantically describing data.
- Improving legibility when compared to handwritten DLs.
- Easing preparation of DLs & work practices of hospital clinicians.
- Assessing GP preferences in order to reach a suitable DL standard. Detecting adverse events and error rates.
- Providing support across heterogeneous systems (e.g. cross country)
- Improving the security offered by paper based DLs (electronic signature)
- Preserving the privacy offered by paper based DLs.

Derived benefits for the patient

- Patient empowerment
- In contrast with centralized solutions, the patient is the carrier of the information
- Medications notifications
- Follow up and appointment management
- Reducing handling operations and paper saving.
- Ultimately, increasing patient safety and quality of care.

app demo…